

WHAT IS CLAIMED IS:

1. An ink jet printing apparatus that uses a printing head and ejects ink from the printing head to a surface of a printing sheet, which has air permeability from an obverse side of the printing sheet to a reverse side of said printing sheet, said apparatus comprising:

transporting means for transporting the printing sheet relatively to the printing head;

reacting liquid applying means provided on a location along a transporting path of said transporting means so as to apply a reacting liquid, which reacts with ink ejected to a face of the transported printing sheet from the printing head, to a whole area of said printing sheet; and

suction means provided on a location along the transporting path of said transporting means so as to apply a suction force on the transported printing sheet in a direction from the obverse side to the reverse side of said printing sheet in order to move the reacting liquid to an inside of the printing sheet.

2. An ink jet printing apparatus as claimed in claim 1, wherein said suction means changes a magnitude of the suction force so that a permeation state of the reacting liquid or a reacted product of the ink and the reacting liquid in the printing sheet is varied.

3. An ink jet printing apparatus as claimed in claim 1, wherein said reacting liquid applying means uses a printing head and eject the reactive liquid to the printing sheet from said printing head so as to apply the reactive liquid.

4. An ink jet printing apparatus as claimed in claim 1, wherein said reacting liquid applying means uses a coating roller for coating the reactive liquid to the printing sheet and coats the reacting liquid to the transported printing sheet while rotating the coating roller.

5. An ink jet printing apparatus as claimed in claim 1, wherein said suction means applies the suction force on the transported printing sheet after the reacting liquid is applied to the printing sheet and before the ink is ejected to said printing sheet.

6. An ink jet printing apparatus as claimed in claim 1, wherein said suction means applies the suction force on the transported printing sheet after the reacting liquid is applied to the printing sheet and while the ink is ejected to said printing sheet.

7. An ink jet printing apparatus as claimed in claim 1, wherein said suction means applies the suction force on the transported printing sheet after the reacting liquid

is applied to the printing sheet and after the ink is ejected to said printing sheet.

8. An ink jet printing apparatus as claimed in claim  
5 1, wherein said suction means applies the suction force on the transported printing sheet continuously from time when the reactive liquid is applied to the printing sheet to time after the ink is ejected to said printing sheet.

10 9. An ink jet printing apparatus as claimed in claim 1, wherein the suction force of said suction means applies is determined so that a reacted product of the ink and the reacting liquid is uniformly distributed in an inside of a layer of the printing sheet.

15 10. An ink jet printing apparatus as claimed in claim 1, wherein the reacting liquid is a liquid for insolubilize or coagulate a coloring material in the ink.

20 11. An ink jet printing apparatus as claimed in claim 1, wherein the reacting liquid is color ink.

12. An ink jet printing apparatus as claimed in claim  
1, wherein said suction means uses an air suction device  
25 used for recovery processing for the printing head.

13. An ink jet printing apparatus as claimed in claim

1, wherein said suction means controls the suction force correspondingly to an ejection timing in the printing head and a transporting timing of the printing sheet.

5           14. An ink jet printing apparatus that performs printing with color ink on a printing sheet, which has air permeability from an obverse side of the printing sheet to a reverse side of said printing sheet, said apparatus comprising:

10           reacting liquid applying means for applying a reacting liquid, which reacts with the color ink, to a whole area of the printing sheet; and

            suction means for, at least before performing printing with the color ink, applying a suction force on the printing  
15 sheet in a direction from the obverse side to the reverse side of said printing sheet so as to move the reacting liquid to an inside of the printing sheet.

            15. An ink printing method of performing printing  
20 with color ink on a printing sheet, which has air permeability from an obverse side of the printing sheet to a reverse side of said printing sheet, said method comprising:

            a reacting liquid applying step for applying a reacting liquid, which reacts with the color ink, to a whole area  
25 of the printing sheet; and

            a suction step for, at least after the reacting liquid is applied to the printing sheet and before performing

printing with the color ink, applying a suction force on the printing sheet in a direction from the obverse side to the reverse side of said printing sheet so as to move the reacting liquid to an inside of the printing sheet.

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16. An ink printing method as claimed in claim 15, further comprising a suction step for applying a suction force on the printing sheet while performing printing with the color ink.

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17. An ink printing method as claimed in claim 15, wherein said reacting liquid applying step applies the reacting liquid as a droplet to the printing sheet to supply the reacting liquid to a whole area of the printing sheet by permeation, before performing printing with the color ink.

18. An ink printing method as claimed in claim 15, wherein said reacting liquid applying step coats the reacting liquid to the printing sheet through a surface of a rolling body to supply the reacting liquid to a whole area of the printing sheet by permeation.